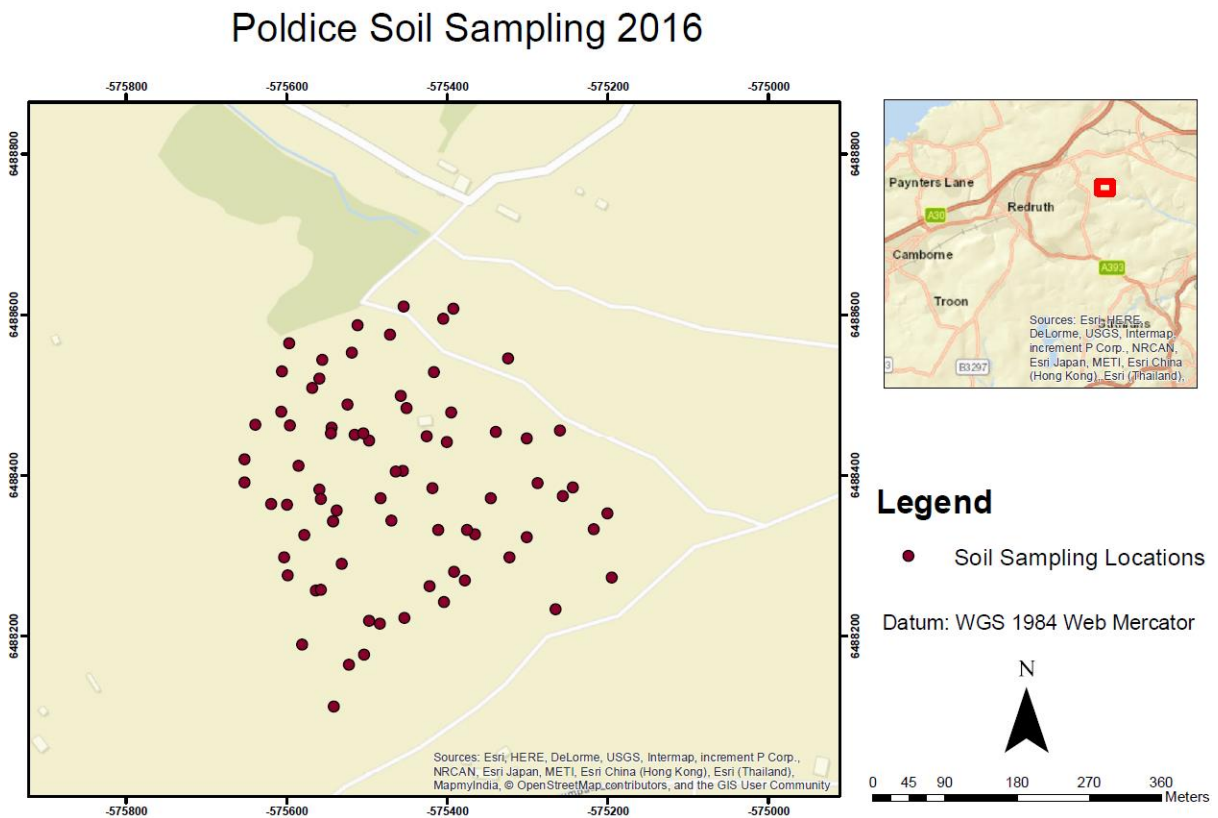


In August 2016, I wrote an article about geoscience data management requirements and the application of GIS apps on smartphones or tablets. Meanwhile, I tested the applications in the field during a number of occasions. As part of a study of the historic Poldice mine site in Cornwall, the ground contamination and associated arsenic and cadmium levels were assessed by auger sampling the top soil and subsequent analysis by pXRF. The ESRI Survey123 App was tested in order to simplify and streamline the soil sampling process.

Accuracy of GPS location data

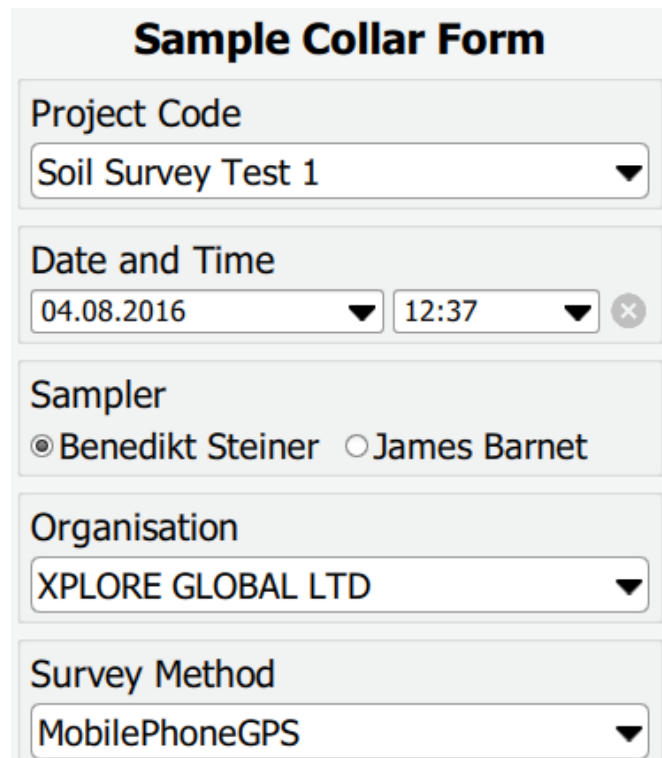
Poldice is located near St Day in a remote part of western Cornwall, whereby the accuracy of GPS data varied throughout the site. Initial tests of GSM network and GPS-based location data were carried out showing that the accuracy of GSM network triangulation is poor ($\pm 30-90m$), probably due to large distances between network masts in the area. Switching off the GSM network considerably improved the GPS accuracy to $\pm 5-10m$. Nevertheless, the data points showed a good degree of overall accuracy. In order to increase the reliability of location data, a separate Garmin GPS was used and UTM coordinates manually entered into provided data fields within the sample form collar.



Location of the Poldice ground and soil sampling points.

Use of sampling templates

In order to facilitate the sampling process, a sampling template previously developed in July 2016 was customised for ESRI's Survey123 App. Starting with a sample header and followed by detailed sample properties (regolith category, sampling depth, moisture, contamination, etc.), the sampler fills out a number of boxes using either pre-defined drop-down lists or free text/ numbers. The interface also allows the capture of sample photos, additional location coordinates and QAQC information.



Sample Collar Form

Project Code
Soil Survey Test 1

Date and Time
04.08.2016 12:37

Sampler
 Benedikt Steiner James Barnet

Organisation
XPLORE GLOBAL LTD

Survey Method
MobilePhoneGPS

The actual data entry process of 15 data fields per sample took approx. 30 seconds - 1 minute each, which equals similar workflows using traditional sample cards. By the end of the day, a sampling team of three managed to collect and record close to 80 soil samples in at times difficult terrain.

Data Management

Upon return to base camp, within a few minutes the captured data was uploaded to ArcGIS online. This allowed the instant viewing (ArcGIS online interface or ArcMap), sharing and downloading of the data in .csv, .shp and .gdb formats.

In this particular trial, only one sampler used the app to collect data. It is, however, equally possible to have multiple samplers using the app on their respective smartphones and then sharing the collected information within their organisation.

Conclusion

The development and application of GIS-based smartphone apps does add value to geoscientific field campaigns, whether those are in the fields of mineral exploration, contaminated land, geological mapping or other ground surveying activities. Whilst geoscientists are encouraged to use proven and traditional fieldwork methods, modern technology provides options for increased work productivity and sharing of data.



Sample entry using a smartphone. Survey123 allows to take and save photos in geodatabases.